Non-covalent functionalization of reduced graphene oxide using sulfanilic acid azocromotrop and its application as supercapacitor electrode material

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Tables

Table S1. Comparative data's of Raman study, electrical conductivity and electrochemical properties of similarly modified graphene.

Sample	I_D/I_G	σ ($S\ m^{-1}$)	Electrochemical performances				Reference
			Cell configuration	SC ($F\ g^{-1}$)	ED ($W\ h\ Kg^{-1}$)	PD ($W\ kg^{-1}$)	
ADS-G	1.03	-------	3-electrode	210 at 4.5 $A\ g^{-1}$	-------	-------	1
Functionalized graphene	1.1		3-electrode	276 at 0.1 $A\ g^{-1}$	20.0	34.5×10^3	2
Poly(p-phenylene diamine)/graphene	>1	294.9	2-electrode	248 at 2 $A\ g^{-1}$	5.8	0.5×10^3	3
Graphene oxide hydrogel	1.3	1351	2- electrode	232 at 1 $A\ g^{-1}$	33.5	500	4
SPEEK modified graphene	1.01	-------	3-electrode	476 at 6.6 $A\ g^{-1}$	-------	-------	5
Microwave generated graphene	>1	-------	2- electrode	219 at 1 $A\ g^{-1}$	83.56	1.66 $\times10^3$	6
Chemically derived graphene	1.15	431	3- electrode	253 at 0.2 $A\ g^{-1}$	-------	-------	7
3,4-propylenedioxythiophene	>1	22.5	3- electrode	201 at 10 $mV\ s^{-1}$	-------	-------	8
ACA–G (chemical)		-------	3- electrode	148	-------	-------	9
9-anthracene carboxylic acid modified graphene	1.41	-------	3- electrode	577	-------	-------	10
NC-TEG	1.29	-------	3- electrode	635	-------	-------	11
n-doped graphene	1.28	800	Three electrode	295 at 5 $A\ g^{-1}$	40.3	2500	12
O-TEG	1.44	271	3- electrode	175 at 1 $A\ g^{-1}$	-------	-------	13
PCA-graphene	-------	-------	2- electrode	202 at 10 $mV\ s^{-1}$	-------	-------	14
Graphene–polypyrrole nanocomposite	-------	6.56	3- electrode	267 at 100 $mV\ s^{-1}$	94.93	3797.2	15
SPEEK modified graphene	0.49	-------	3- electrode	244 at 2.2 $A\ g^{-1}$	-------	-------	16
TCNQ-graphene	1.04	-------	3- electrode	324 at of 1 $A\ g^{-1}$	86.9	300	17
ANEG	0.32	-------	3- electrode	115 at 4 $A\ g^{-1}$	-------	-------	18
ACA-rGO	1.2	-------	2- electrode*	610 at 0.8 $A\ g^{-1}$	41.3	200	19
Graphene materials (GMs)	-------	100	2- electrode	205 at 0.1 $A\ g^{-1}$	28.5	10000	20
Thermally Reduced graphene	-------	-------	2- electrode	132 at 10 $m\ V\ s^{-1}$	6.74	190	21
KOH modified graphene	-------	-------	3- electrode	136 at 10mVs^{-1}	18.9		22
SAC-RGO	0.97	551	3- electrode	366 at 1.2 $A\ g^{-1}$			Present work

Where, σ, SC, ED and PD refer to electrical conductivity, specific capacitance, energy density and power density, respectively. The 2-electrode asymmetric configuration has been represented by the symbol "*".

Table S2. Comparative study of electrochemical properties of various electro active materials with asymmetric configurations.

Materials	SC ($F g^{-1}$)	ED ($W h Kg^{-1}$)	PD ($W Kg^{-1}$)	References
MnO_2/ graphene	37 at 5 mA cm^{-1}	25.2	100	23
Carbon Nanotube /Graphene and Mn_3O_4 Nanoparticle	72 at 0.5 A g^{-1}	32.7	-	24
Manganosite-microwave exfoliated graphene oxide	51.5 at 0.1 A g^{-1}	2.6	9024	25
Polyaniline/Graphene/Carbon Nanotube	107 at 0.2 A g^{-1}	20.5	2500	26
$Ni(OH)_2$/graphene and RuO_2/graphene	87 at 0.5 A g^{-1}	31	420	27
Graphene-Nickel Cobaltite Nanocomposite	288 at 0.5 A g^{-1}	7.57	5600	28
3D MnO2/graphene hydroge	59.6 at 1 A g^{-1}	21.2	8200	29
Reduced graphene oxide/carbon nanotube and carbon fiber paper/polypyrrole	82.4 at 0.5 A g^{-1}	28.6	15100	30
Nickel oxide/graphene foamand hierarchical porous nitrogen-doped carbon nanotubes	116 at 1 A g^{-1}	32	700	31
HydrousRuO_2 -ionic liquid functionalized-chemically modified graphene	-------	19.7	6800	32
Graphene hydrogel (GH) with 3D interconnected pores	-------	23.2	1000	33
Functionalized graphene aerogel composites	175.8	13.9	13300	34
SAC-RGO//RGO	95 at 1.4 A g^{-1}	25.86	980	Present work

Figures

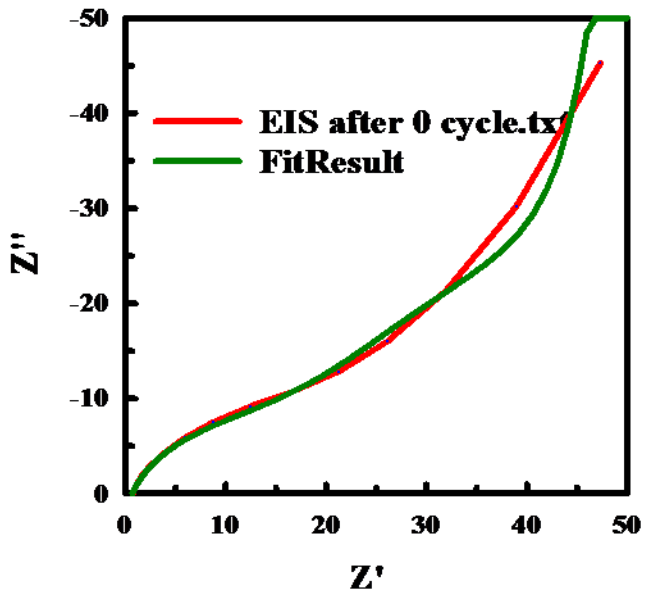

Fig. S1. Z-view fitted curve of SAC-RGO //RGO at 1st cycle

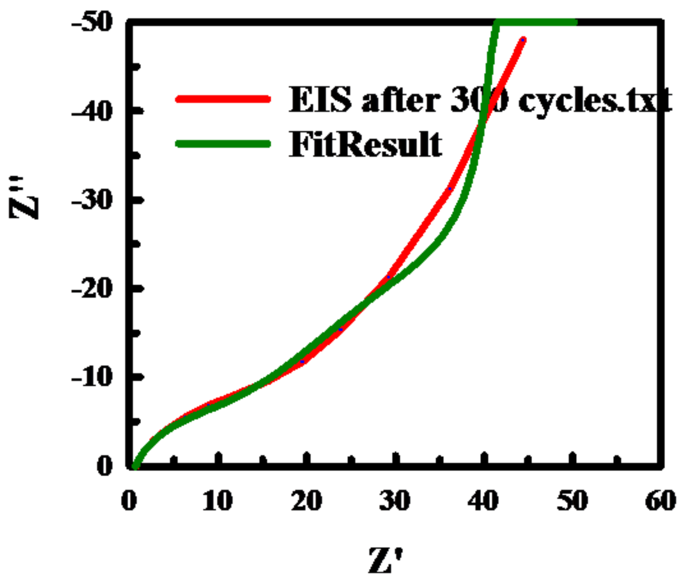

Fig. S2. Z-view fitted curve of SAC-RGO //RGO after 300 cycles

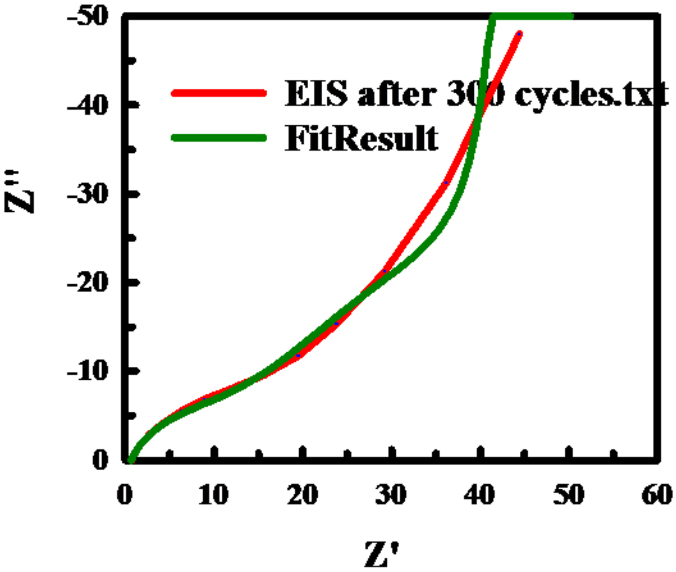

Fig. S3. Z-view fitted curve of SAC-RGO //RGO after 1000 cycles

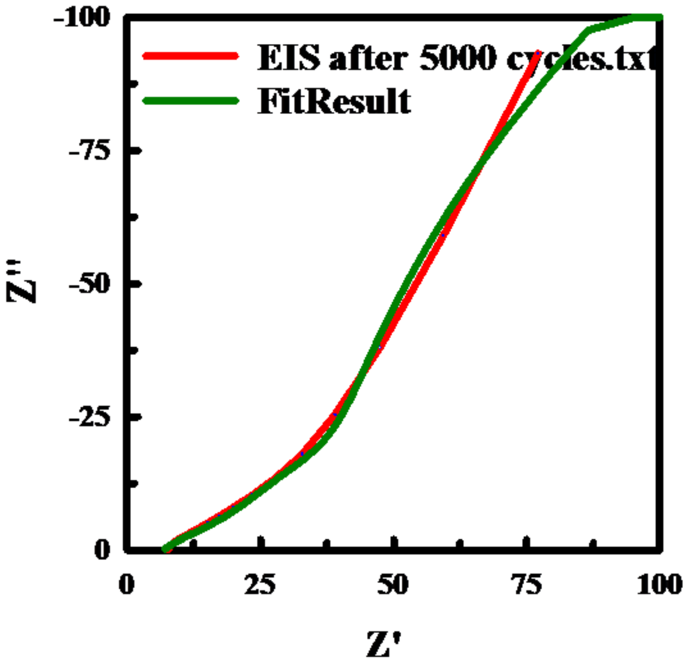

Fig. S4. Z-view fitted curve of SAC-RGO //RGO after 1000 cycles

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